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NOMINAL AND IMPERATIVE ICONIC GESTURES USED BY THE KHOISAN OF NORTH WEST BOTSWANA TO COORDINATE HUNTING

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ABSTRACT Twenty-three elderly males from nine Khoisan ethnic communities currently living in Botswana were interviewed in August 2012. The interviews concerned the audio (paralinguistic) and gestural means of communication that the men use during hunting. Hunters sometimes command attention through whistles, clicks and bird-like chatter, but communication is mainly gestural. Deictic (pointing) gestures are used to indicate the location of game and are followed by iconic hand movements to direct hunting partners. Both types of gestures, as well as audio signals, function as imperatives. They are accompanied by nominal iconic hand gestures that communicate the identity of the game by reproducing salient features, such as horns, tusks, ears, and tails. !Xõ hand shapes are frequently based on the contours of an animal's spoor and suggest reduced iconicity. In addition, kinesthetic adverbial features are sometimes used to portray the behavior of the game. There was also some evidence of adjectival modification of deictic (pointing) gestures. A taxonomic lexicon of nominal iconic gestures that depict animals was constructed. Analysis of the hunting communication system revealed the possibility of a basic syntax.

Key Words: Gestural communication; Hunting; Iconic gestures; Khoisan.

INTRODUCTION

Despite the arrival of invasive Bantu agro-pastoralist economic systems more than 1500 Y.B.P. (Chebanne, 2008: 96), some Khoisan(1) groups in the southern African region continued practicing a hunter–gatherer immediate-return economy well into the twentieth century. This economy is believed to be similar to the one practiced by *Homo sapiens* for 99% of humanity's time on Earth (Kuhn & Stiner, 2001: 99; Lee & Devore, 2009: 3). Presently, new forms of income and relocation programs from traditional lands have meant that the global economy is exerting strong pressure on these practitioners to abandon their traditional hunter–gatherer subsistence economy. These populations are now considered multi-income groups; they still hunt and gather to a certain degree, but they derive most of their income from work on cattle posts, growing crops, and herding cattle and goats. In the field of tourism, they sell craft work, act as guides, and offer "the bushman experience," demonstrating traditional hunting, cooking, and dancing rituals. Nonetheless, they have, within living memory, managed to maintain a conservative life style(2) that may offer insights into the past, allowing us to hypothesize about the evolution of human behavior (Marlowe, 2005: 14).

Comparative linguistic studies previously grouped Khoisan languages into a single "click language" family that was set apart from other African languages (Greenberg, 1950; Güldemann & Vossen, 2005. This classification mainly relied on the distinctive feature of click consonants, which are almost unique to this language cluster.[3] However, the idea of one super family for Khoisan languages is no longer accepted among experts. Researchers now recognize 10 distinct Southern Africa non-Bantu click languages (see Brenzinger, 2013 for a compilation of recent findings). This classification more adequately takes into account the fact that the Khoisan are linguistically distant peoples who speak mutually unintelligible languages that are as unrelated as English is to East Asian languages (personal conversation with Hendrik Duplessis). This linguistic diversity is echoed in equally high genetic distancing; both linguistic and genetic data indicate that these populations are extremely ancient (Knight et al., 2003; Pennisi, 2004; Tishkoff et al., 2007).

The beliefs and traditions of these peoples are very similar (Lewis-Williams & Challis, 2011: 91 & 103). This is unsurprising, as traditions (ways of doing things) can easily be passed on from one linguistic group to another through diffusion of cultural activities, whereas languages function to preserve collective identity (Mc Convell, 2008: 151) and therefore remain more localized within ethnic communities.

Shared traditions include shared hunting activities, which have been documented by many ethnographers (Bleek, 1928; Marshall, 1976; Lee, 1979; Ikeya, 1994; Marshall, 1999; Lee, 2003; Liebenberg, 2006). Hunting techniques include setting snares, opportunistic collection of small animals, lying in wait in pre-dug holes near salt licks (Bleek, 1928: 16), hunting with poisoned arrows, and the *persistence hunt* (Liebenberg, 2006).

Lee (1979: 216–219) described the stages involved in hunting with poisoned arrows. The hunting group sets off looking for suitable game, which is located by tracking. Once the party is within visual distance of the game, the stalking stage can begin; the hunters move slowly forward, often bent over so that their backs resemble those of grazing herbivores. They freeze as soon as the targeted game looks up and then continue slowly until the target is within range. One member will then aim and shoot a poisoned arrow into the animal, which runs off. It may take several hours for the poison to take effect, depending on the size of the prey. The party returns to camp and waits until the following day to pick up the trail and locate the weakened animal, which is subsequently dispatched with a spear. The animal is then skinned and carried back to camp and shared among the camp members or, if it is too large, the other camp members are brought to the carcass, which is consumed in situ. The persistence hunt (Schapera, 1965: 133; Liebenberg, 2006) follows a similar pattern except that the game is pursued persistently during the heat of the day until it is exhausted. The animal can then be easily killed at short range using a spear.

Hunters need to communicate information to their fellows in order to coordinate these hunts and indicate the identity of the spoor, the prey species, or the predator that has been spotted. This can be done through discreet paralinguistic audio signals, iconic gestural communication, or a combination of the two. These

signals and gestures constitute a form of communication that is completely independent of the full semantic/syntactic language that is normally used by the hunters.

Several authors have documented gestural communication in different ethnic communities. Takada (2008: 124–125 & 128–130) mentioned both deictic (pointing) gestures and iconic gestures in his work on the discourse of the |Gui/||Gana.[4] These hunters use both verbal and gestural modes of communication to narrate inferred events from tracks and signs left by animals. Additionally, they make ample use of deictic gestures while travelling and tracking in the bushveld to indicate directions and locations. On at least one occasion, hunters used an iconic gesture to indicate a tree landmark (*Acacia erioloba*) "by holding up both hands with the palms spread" (Takada 2006: 112).

Barnard (1992: 155) described an iconic gesture with fingers placed above the head denoting an Eland (*Tragelaphus oryx*) that was used in the "Eland Bull Dance" performed by the Nharo (Naro). Marshall (1976: 136) showed illustrations of the !Kung (Ju|'hoansi) of Nyae Nyae using two iconic gestures that were made with a hand and raised fingers to represent the shape of the horns of the wildebeest (*Connochaetes taurinus*) and the hartebeest (*Alcelaphus buselaphus*). Howell (1970: 184–185) showed 21 different iconic gestures representing animals that were demonstrated by an unspecified ethnic community living in the Kalahari. Hindley (unpublished data) also carried out a study of the iconic gestures used by the Hadza of Tanzania. Similar iconic gestures of the Mbendjele, who live in northern Congo-Brazzaville, were illustrated by Lewis (2009: 244 & plate 5 between pages 206 & 207). Davis (2010: 74, 120, & 196) provided examples of the hunting gestures used in Plains Indian Sign Language (PISL) to denote the grey wolf (*Canis lupus*), the wapiti (*Cervus canadensis*), and the American bison (*Bison bison*), which are employed by ethnic groups living on or around the great plains of North America.

In this paper, I document, classify, and analyze the nominal iconic gestures and associated paralinguistic audio and gestural modes of communication used by hunters from nine different Khoisan ethnic communities living in Botswana.

METHODS

Open-structured informal interviews were conducted with 23 elderly males from Khoisan ethnic groups living in villages and resettlement points in the Ngamiland and Ghanzi districts of Northwest Botswana. Elderly males were chosen because the aim of the study was to collect data concerning past hunting experiences, some of which could have taken place as long as 77 years ago. Based on data from 18 men (five subjects were unable to provide birth dates), the average age of the interviewees was 75.5 years. The Botswana Department of Rural Development and the district commissioners of the Ngamiland and Ghanzi Districts provided locations of resettlement villages that could be visited. The choice of ethnic groups that could be included in the study was restricted to elderly Khoisans who were available for interview within these resettlement areas. Permission was also obtained

from these departments prior to interviewing any subjects. Upon arrival at a resettlement village, permission was also obtained from the *kgosi* (chief) of the village. The purpose of the study was explained in detail before the interviews commenced. The *kgosi* provided interpreters to assist with the interviews. Interpreters were either able to translate directly from the native language of the subject into English or spoke to the subject in Setswana, which was subsequently translated into English for the interviewers. Interpreters were often assistants (court clerks) to the *kgosi*. Table 1 lists the ethno-linguistic group, date and place of birth, and present location of each subject. Birth and current residence locations are shown in Figure 1. Symbols used for click consonants are described in Appendix 1. The naming of ethno-linguistic groups follows the work of Barnard (1992) and Chebanne (2008). Appendix 2 provides supplementary information about these ethno-linguistic communities.

Table 1. Ethno-linguistic group, place and date of birth, and present location of each interviewee

Speech community	Birth date	Birth place	Present location
ǁAni	1952	Gunkhu	Somelo
Danisi	1938	Phuduhudu	Phuduhudu
G|wi	1920	Xade	New Xade
G|wi	1933	Xade	New Xade
ǂHaba	1918	Bothatogo	Somelo
Ju|'hoansi	1931	Xai Xai	Xai Xai
Ju|'hoansi	1920	Namibia	Xai Xai
Ju|'hoansi	unknown	Xai Xai	Xai Xai
Ju|'hoansi	1947	Xangwa	Xai Xai
Naro	1930	Ghanzi	West Hanahai
Naro	1922	Ghanzi	West Hanahai
Naro	unknown	unknown	West Hanahai
Naro	1960	Somelo	Somelo
Nyebequh	1952	West of Maun	Somelo
Sekaukau*	unknown	unknown	D'kar
Sekaukau*	1931	Metsimantle	Groot Laagte
Sekaukau*	1950	Ghanzi	Groot Laagte
Sekaukau*	1926	Groote Laagt	Groot Laagte
Tshao	unknown	Kanye	Phuduhudu
Tshao	1940	Phuduhudu	Phuduhudu
!Xõ	1952	Bere	Bere
!Xõ	unknown	Ghanzi	Bere
!Xõ	1931	unknown	Bere

*This was the speech community indicated by some Ju|'hoansi subjects. The language of the Ju|'hoansi is also known as Sekaukau (Chebanne, 2008: 102). Hereafter, they will be included in the Ju|'hoansi group.

At the beginning of each interview, the subject was provided with an illustrated guide book of southern African mammals (Cillié, 2011) and several photographs of bird species. To "set the scene," the interview began with an informal conversation and occasional questions about the subject's hunting experiences. The data collected from these informal conversations are given in Appendix 3. More specific information was then collected by asking the subject to demonstrate the audio signals and gestures that he used to command the attention of fellow hunters, to indicate direction, to signal to his companions to remain still, and to indicate prey species. These audio signals and gestures were recorded, photographed, and in some cases, filmed.

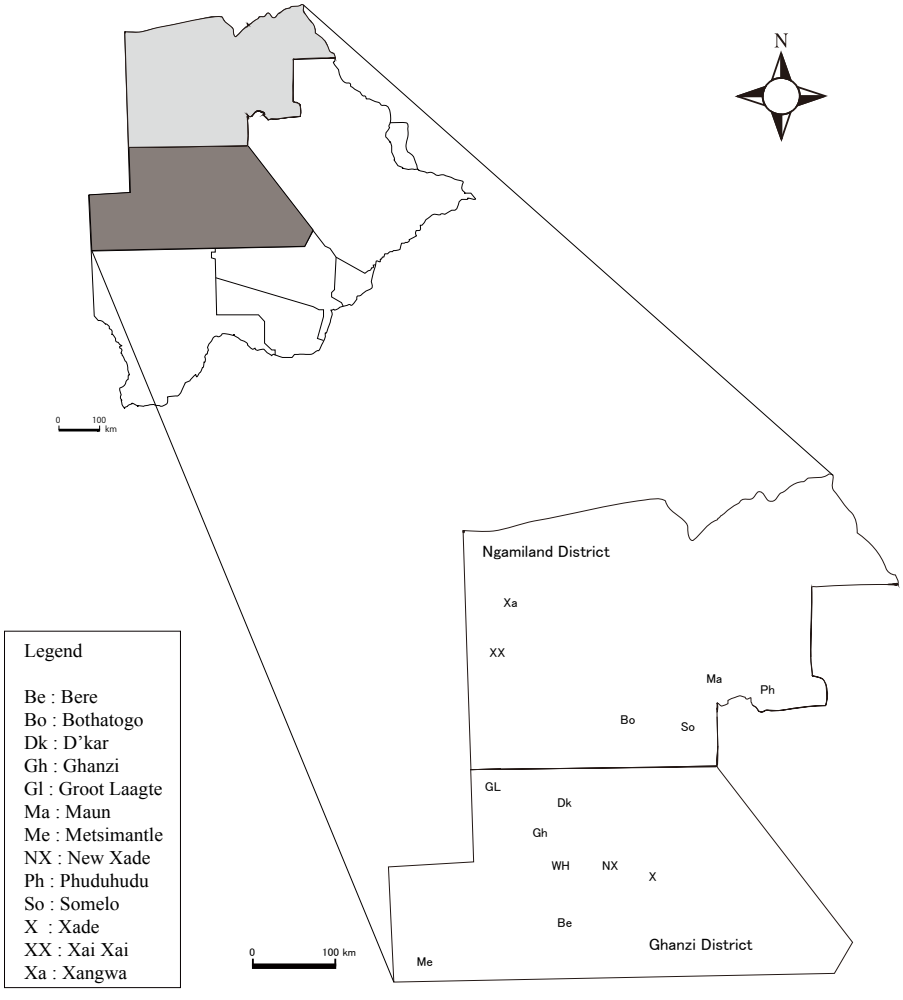

Fig. 1. Birth and residence locations in the Ngamiland and Ghanzi Districts, Botswana
Kanye is located 60 km Southwest of Gaborone. At the time of writing, the precise location of Gunkhu was unavailable.

RESULTS

1. Audio signaling and the imperative

Of the 23 interviewees, 13 indicated that they used whistles to communicate with their hunting partners (figures in brackets indicate the number of subjects using a particular communication system): Ju|'hoansi (5), Naro (3), !Xõ (2), G|wi (2), and ǂHaba (1). Only one !Xõ subject said that he used click consonants to attract the attention of his hunting partners. One !Xõ used a chattering sound that mimicked bird calls. Eleven interviewees stated that they had never used

sounds during hunting: Ju|'hoansi (4), !Xõ (1), Naro (2), Tshao (2), ||Ani (1), and Danisi (1). These interviewees explained that if they were at the front of the hunt, their hunting partners would always pay close attention to their movements. In this way, audio signals, which could potentially disturb the prey, were unnecessary, and silent gesturing could be used. Knight et al. (2003: 464) hypothesized that clicks were originally used to coordinate hunting. However, in this study, only one !Xõ subject among the 23 interviewees used clicks as audio imperatives to attract attention. The main means of audio communication was through whistles. This corresponds with the observations of Liebenberg (1990: 108 & 55, cited in Sands & Güldemann, 2009: 210). There was no mention of the devoicing featured in Marshall's films on hunting (Knight et al 2003: 471), in which the Ju|'hoansi communicate with each other during hunting episodes in hushed whispers that consist of click consonants.

2. Holistic imperative gestures

Four different types of holistic imperative gestures were identified.

(1) Waving, which functioned in the same way as vocalizations, i.e., to attract the attention of hunting partners.

(2) Deictic gestures (indexical pointing) were used to indicate the location of game (Fig. 2).

Fig. 2. A !Xõ indicates the location of game

(3) Deictic (pointing) iconic gestures were used to indicate the location of game and its identity. Figures 3 and 4 show two gestures that incorporate supplementary information through the choice and position of the digit used to point. This information could concern the identity of the animal or spoor that is being indicated.

(4) Imperative iconic gestures were used to direct hunting partners (Fig. 5). These were considered iconic in the sense that the emitter used his hands to mimic the action he desired his hunting partner to make. For example, in Figure 5, the emitter beckons to his partner with his arm outstretched, his fingers together and pointing downwards. This gesture is completed by moving his hand from its outstretched position inward

Fig 3. A Naro indicates the location of spoor

Fig 4. A Nyebequh indicates the location of a lion

Fig. 5. A Ju|'hoasni beckons to partners

toward his body, thus mimicking the action that his companion should make to move towards him. Similarly, when a hunter required a partner to crouch down, he used a gesture with the fingers of the hand outstretched and the palm facing downward, accompanied by a downward movement of the hand that mimicked the motion of a crouching action. Likewise, when requiring a partner to retreat, a gesture was made by pushing the bent fingers away from the body. These are all, of course, pan-human gestures and not specific to the Khoisan.

3. Nominal and adverbial iconic gesturing

Nominal iconic gesturing was used to portray the animal species listed below.

List of game species and predators mentioned during interviews

Aardvark (*Orycteropus afer*)
African wild dog (*Lycaon pictus*)
Bat-eared fox (*Otocyon megalotis*)
Black-backed jackal (*Canis mesomelas*)
Blue wildebeest (*Connochaetes taurinus*)
Buffalo (*Syncerus caffer*)
Caracal lynx (*Felis caracal*)

Cheetah (*Acinonyx jubatus*)
Common duiker (*Sylvicapra grimmia*)
Elephant (*Loxodonta africana*)
Gemsbok (*Oryx gazell*a)
Giraffe (*Giraffe camelopardalis*)
Impala (*Aepyceros melampus*)
Leopard (*Panthera pardus*)
Lion (*Panthera leo*)
Plains zebra (*Equus quagga*)
Red hartebeest (*Alcelaphus busselaphus*)
Spotted hyena (*Crocuta crocuta*)
Springbok (*Antidorcas marsupialis*)
Steenbok (*Raphicerus campestris*)
Warthog (*Phacochoerus aethiopicus*)
Eland (*Tragelaphus oryx*)
Greater kudu (*Tragelaphus strepsiceros*)
Ostrich (*Struthio camelus*)
Crested guinea-fowl (*Guttera edouardi*)

These gestures were mostly performed with one hand and, occasionally, the upper arm. Two nominal iconic groups were identified. The most common iconic gestures were hand shapes that mimicked the salient features of animals; these were often horns (Fig. 6), tusks (Fig. 7), ears (Fig. 8), or more rarely, tails (Fig. 9). Different ethnic communities often used similar gestures for the same species. This is unsurprising given the iconic nature of the gestures.

Fig. 6. Springbok horns (||Ani)

Fig. 7. Warthog tusks (Ju|'hoansi)

Fig. 8. Hyena ears (Nyebequh)

Fig. 9. Hyena tail (G/wi)

The second group of iconic gestures, which were unique to the !Xõ, were hand shapes that were used to portray the animal by depicting the outline of its spoor (Figs. 10–13).

Fig. 10. Eland (!Xõ)

Fig. 11. Gemsbok (!Xõ)

Fig. 12. Fox (!Xõ)

Fig. 13. Guinea fowl (!Xõ)

Animation of the hand within the signing space was sometimes used to indicate the gait of the animal; this movement added additional information to the portrayal created by the nominal gesture. For example, the most widely used gesture for the common warthog (*Phacochoerus aethiopicus*) was performed with the fingers bent over and the fifth digit and thumb projected outwards to represent the tusks (Fig. 7). This was often accompanied by a rotation of the hand within the signing space indicating its gait. Additionally, changes in the speed of rotation were used to indicate the speed at which the animal was travelling. These movements, which were termed *adverbial gesturing*, added both a verbal and an adverbial element to the nominal gesture. That is to say, they expressed not only what the animal was doing (running) but also how it was doing it (running fast) and, in some cases, additional behaviors of the animal. For example, a Naro interviewee used animated gestures to indicate African wild dogs (*Lycaon pictus*) trotting or stalking prey.

Although the nominal iconic gesture is easily separated from the adverbial feature, this is not true of verbal and adverbial aspects. The ‘verb’ (movement of the iconic hand gesture) and the ‘adverb’ (speed or kind of movement) merge into one another; thus, adverbial gesturing can be considered holistic in nature.

Iconic gestures were classified according to the species they represented and

were then compared to current biological taxonomies (Appendix 4). The iconic taxonomic lexicon of animals found in the Khoisan environment matched existing biological taxonomies, although it was much less detailed. Gestures denoting mammalian carnivores were clearly distinct from herbivores. Within the carnivore order, most gestures distinguished canids from felids, but gestures for the lion (*Panthera leo*) and the leopard (*Panthera pardus*) were often identical, as were those for the bat-eared fox (*Otocyon megalotis*) and the black-backed jackal (*Canis mesomelas*). However, gestures for the spotted hyena (*Crocuta crocuta*) were distinguishable from those used to portray the African wild dog (*Lycaon pictus*). Among herbivores, gestures for small antelopes such as the grey duiker (*Sylvicapra grimmia*), the steenbok (*Raphicerus campestris*), and the springbok (*Antidorcas marsupialis*) were often similar. In most cases, gestures for larger antelopes were distinguishable from one another.

Gestures denoting species differentiation would be important if the behavior of the animal differed under hunting pressure, possibly necessitating different hunting strategies. For example, the gemsbok (*Oryx gazella*) is more likely to stand its ground and charge, whereas the greater kudu (*Tragelaphus strepsiceros*) more readily takes flight (Blurton-Jones & Konner, 1978: 347). However, as will be seen below, iconic gesturing did not always follow these distinctions.

4. Comparison of iconic gestures among ethnic communities

An analysis conducted to determine whether certain ethnic communities used similar gestures proved inconclusive. That is to say, no two ethnic communities consistently used the same or similar gestures over a range of species. However, a certain number of differences in iconic gesturing were noted. The !Xõ gestures were based on the shape of the spoor. This was also noted in the Naro for the warthog and the ||Ani for the ostrich (Appendix 5). The Ju|'hoansi used the same signs for the eland and the gemsbok. The Naro used the same sign for the eland, gemsbok, and greater kudu. The Ju|'hoansi (Sekaukau) used their arms held above the head to indicate the greater kudu, the eland, and the gemsbok. Nevertheless, in some cases, the elbows were bent and the palms of the hands were turned toward the observer, with the fingers held together or spread apart. These variations may constitute essential differences for distinguishing among species.

On occasion, the arthritic hands of some elderly interviewees made it difficult to determine whether some gestures were the same or different. However, the Danisi interviewee demonstrated gestures for bovids that, although superficially similar, appeared to reveal differences between species through subtle changes in finger shapes. These finger shapes echoed the difference between the more curved horns (Fig. 14) of the red hartebeest (*Alcelaphus buselaphus*) compared with the more open horn shape (Fig. 15) of the impala (*Aepyceros melampus*). Subtle differences were also found in the gestures depicting spoor shapes made by the !Xõ to denote the eland (*Tragelaphus oryx*), which leaves a curved spoor (Fig. 10) compared with the pointed spoor (Fig. 11) of the gemsbok (*Oryx gazella*).

Fig. 14. Hartebeest (Danisi)

Fig. 15. Impala (Danisi)

5. Supplementary gestures

During the course of certain interviews, respondents indicated that communication during hunting included supplementary gestures in addition to imperatives, nominal iconic gestures, and adverbial elements. For example, a Naro interviewee demonstrated an animated gesture (Fig. 16) that involved shaking the hand, which indicated that the tracks of an animal had been made recently. Takada (2008: 124) described a similar "waggled" left-hand gesture made by a |Gui/||Gana hunter when encountering the tracks of a Springhare. These gestures could be termed adjectival, as they provide further information about the age of the tracks; i.e. they communicate the information "fresh tracks."

Fig. 16. A Naro indicates that the tracks are fresh

DISCUSSION

The combination of audio imperatives, deictic, and iconic gestures accompanied by nominal iconic gestures with adverbial and adjectival features constitutes a communication system that is used in tracking and hunting. Here, I analyze the semiotics and linguistics of these systems before discussing their possible function outside the hunting arena in situations such as narration and dance.

1. The semiotics of hunting communication systems

Hunting communication systems are used during the various stages of hunting described by Lee (1979: 205) to track, locate, and stalk game. More specifically they are used by the 'leader' to command the attention of fellow hunters, to indicate that game has been spotted; to indicate its location, to direct hunting partners, to identify the prey species, and to describe the animals' behavior. A hunting communication system is a rudimentary dual audio/visual mode of transferring information that, nevertheless, consists of distinct lexical items (both audio signals and sign morphemes) as well as holistic signaling.

Whistles, clicks, and bird-like chatter are used as audio imperatives to attract the attention of fellow hunters who are out of visual range. Imperative hand and arm gestures (waving and pointing) replace audio communication once the other hunters have moved into visual range. These imperatives convey holistic instructions such as "look in this direction," "come here," or "get down." They are either deictic (pointing and waving to indicate location) or iconic when used "to represent human actions by using the hands in an analog fashion" (Morford & Kegl, 2000: 379). Kita (2000: 162), after the work of McNeill (1992), termed both abstract deictic (finger pointing) and iconic gestures as *representational* because they "have a relatively transparent form–function relationship." Other representational gestures accompany these imperatives and function as substantives to communicate the identity of the prey species or tracks. These nominal gestures, even though iconic, appear to resemble the *emblems* described by Ruiter (2000: 285) because their "form–meaning relation" must be lexicalized for hunting partners to identify each other's signs. There is also some evidence that in certain cases, nominal iconic features may be incorporated into deictic (pointing) gestures, as shown in Figures 3 and 4. On occasion, simultaneous movements of the hand (fingerings) within the signing space have adverbial functions to indicate the speed and/or the behavior of the prey and adjectival gestures (wiggling of the hand) indicate the freshness of the spoor.

2. A linguistic analysis of hunting communication systems

Audio/visual imperatives and iconic gestures constitute lexical items (Table 3) that may be recombined to form vocal–gestural packages. These packages can be translated into sentences such as "Look [at me], crouch down, look over there, [there is a] gemsbok [running] fast."

Table 3. Lexical items that constitute vocal–gestural packages

Lexical item	Function	Grammar	Translation
Soft whistle	Command attention	Imperative	Look [at me].
Hand/arm gesture	Give instructions	Imperative	Crouch down.
Indexical pointing	Transmit prey location	Declarative imperative	Look over there.
Iconic hand gesture	Transmit prey identity	Substantive	Gemsbok.
Rapid hand movement	Show speed/behavior of prey	Adverbial element	[Running] fast.

To a certain extent, the hunting procedure imposes an order on the lexical items, as the followers have to look at the person in front before any further transmission of information can take place. Furthermore, the follower(s) must take care not to be seen before looking in the direction indicated to avoid being detected by the prey. This gives rise to the following basic syntax: imperative(s) + declarative imperative + substantive/adverbial element.

3. From icon to symbol

As well as demonstrating syntax through the necessity of following a procedural order, hunting communication systems also illustrate how a shift from iconicity toward symbolism might take place. In the majority of nominal gestures, the hands and arms were used to represent a prominent physical aspect of the animal: horns, tusks, ears, profile, or tail. These iconic gestures are visual onomatopoeia; they attempt to portray the referent (the prey species) in the most direct way possible.(6) They are therefore high on the iconic scale. However, in some !Xõ gestures, the descriptor was a hand shape suggesting the animal's spoor and not the actual animal (Fig. 10). Following Peircean terminology, this constitutes an index, an intermediary between an icon and a symbol. It is iconic in that it represents the spoor, yet symbolic in that the iconic print gesture uses an index of the species (its spoor) to represent the whole animal. However, it falls outside the true definition of a symbol because it cannot be said to have a completely arbitrary relationship to its referent (Foley, 2001: 25–26; Mithen, 2006: 289). Symbols represent "the concept of the object without the necessity for direct physical association" (Barham & Mitchell, 2008: 179). In fully developed symbolic speech, combinations of phonemes are used as symbols, as exemplified by the word "kudu," which is used as a symbol descriptor to represent *Tragelaphus strepsiceros*.

During the evolution of fully developed symbolic speech, it is plausible to envisage a transition toward symbolism along an icon-symbol continuum that has been variously described as an iconic scale in referentiality (Lewis, 2009: 253–254), a gesture continuum (Davis, 2010: 184), and a "*bleaching* of iconicity over cultural time" (Fitch, 2010: 438). This transition involves *cognitive distancing* between the perceived entity and the descriptor. This distancing is achieved through *indexical referencing* (Deacon, 2003: 121), which is also probably used by the !Xõ hunter when he perceives the external phenomena of tracks and recognizes the relationship between these and the animal referent that produced the tracks. This is an easy task for the hunter because not only is he an experienced and artful tracker but also, according to Lewis-Williams & Challis (2011: 136), he also believes in a close and mystical relationship between the animal and its spoor.

A further example of indexical referencing is provided by Howell (1970: 185), who illustrated the gesture for the vervet monkey (*Cercopithecus aethiops*) that was used by an unspecified ethnic group in Southern Africa. The monkey is cognitively indexed to man and thus is represented by the sign of the palm held upwards (an indirect reference to man). The hunter incorporates this indexing into his hunting language by indicating the referent through a gesture that is no longer directly iconic. This indexing weakens iconicity and pushes iconic hunting

communication towards symbolism.[7]

4. From hunting communication systems to narration through mime and dance

During certain demonstrations of iconic gestures, the subjects became carried away by their portrayals. They would move their whole body in a kinesthetic imitation of the animal referent, incorporating its physical form, behavior, and gait, resulting in what Fitch (2010: 435) described as pantomimes in which objects and actions were iconically "acted out." The American anthropologist Elizabeth Marshall Thomas gave this description of a Ju|'hoansi hunter watching a wildebeest:

> ... he did not run after the wildebeest, he got to his feet and gazed after them, unconsciously making a gesture with his hand representing the head and horns of a wildebeest. He moved his hand in time with the running, saying softly: 'huh, huh, boo. Huh, huh, boo', the sound of their breath and grunting as they ran. (Lewis-Williams & Challis, 2011: 88)

These pantomimes demonstrate the extent to which an animal's behavior is perfectly known and enjoyed. "In a sense, the hunter becomes the antelope. He thinks himself into the animal" (Lewis-Williams & Challis 2011: 89) and believes that his own actions not only echo, but also direct the animal's behavior; successful hunts result from hunters' behaving as they wish the animal to behave.

This belief in a fusion between the hunter and the prey extends into the close relationship that exists among animal mimicry, dance, and narration. Iconic gesturing is used extensively in ritual, as, for example, in the initiation ceremony of the Eland Bull Dance (Bleek, 1928: 23; Barnard, 1992: 155). Animal mimicry is also employed in narration (Hewes, 1973: 8), and our ancestors may have mimed their hunting stories in the same way that modern Mbendjele children play hunting games in which both prey and hunters are mimicked, forming mime narratives of hunting scenes (Lewis, 2009: 250). Davis (2010: 151) described this as a constructed action or dialogue in which the narrator takes on the role of other characters in the story, in this case the hunted animal.

5. Future research

The Khoisan possess a rich lexicon of iconic gestures that are used to depict the animals they encounter in their environment. The use of adverbial and adjectival features in gestures indicates that the communication system used in hunting may be much more complex than was previously thought. It is hoped that this study will open up the possibility of further research to more fully describe these communication systems and their functions within and outside the hunting arena.

NOTES

(1) Many collective terms have been used for these peoples, such as Khoisan, Bushman, Basarwa, etc. All of these have extraneous connotations, and none is ideal (Barham & Mitchell, 2008: 463). In this paper, wherever possible, collective terms will be avoided, and groups will be referred to by name with the aim of preserving ethnic/linguistic identity. See Barnard (1992: 11) for a detailed taxonomy of the ethnic groups of the southern African region.
(2) There has been some disagreement as to whether these indigenous peoples have always practiced a conservative hunter–gatherer immediate-return economy. These contentions are summarized in the "Kalahari Debate" (Barham & Mitchell, 2008: 430).
(3) Clicks are also found in the Hadza and Sandawe languages of Tanzania and in an extinct male initiation dialect in the Damin of Australia (Hale, 1992). They are also present in some Bantu languages such as IsiXhosa, but arrived there by contamination from indigenous peoples' languages. Clicks also have widespread usage in many languages as paralinguistic utterances such as 'Tsk tsk' in English. See Sands & Güldemann (2009: 217) for examples from a range of languages.
(4) |Gui is an alternative spelling of G|wi.
(5) Simultaneous (co-occurring) morpho-semantic features (Davis, 2010: 158)
(6) The importance of onomatopoeia in naming animals is also discussed by Lewis (2009: 253–254) and Fitch (2010: 448).
(7) For more information concerning the hierarchical cognitive pathways that link iconicity to symbolism, see Deacon (2003: 121).

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Appendix 1. Symbols used to represent click consonants

Click sounds and their English equivalents (Crawhall & Ostler, 2005: 5)
| or / dental click.
! central alveolar click. The tongue is placed on the point of division between the palate and the alveolus.
|| or // lateral alveolar click.
ǂ (IPA term) or ≠ palatoalveolar or palatal. The tongue is slid from a laminal dental to a laminal palate-alveolar position.

Appendix 2. Supplementary information concerning the ethnic/linguistic communities that participated in the study

1. **||Ani**
Names: Also known as the ||Anikhoe or ||Anikhwe.. They are members of the Northern Khoe group (Barnard, 1992: 122).
Location: Today, they are mostly located along the Okavango Panhandle in Botswana.
Supplementary information: The language is believed to be on the verge of extinction (Naude & Le Roux, 2005: 94).

2. **Danisi**
Names: Eastern Khoe bushmen also known as Daniswa

3. **G|wi**
Names: G|wi are members of a dialect group closely related to the G||ana, more correctly called G|uikhoena and G||anakhoena, where khoena means 'people' (Barnard, 1992: 98). They are Khoe-speaking bushmen (Sugawara, 2004: 116).
Location: They are the original inhabitants of the region that is now occupied by the Central Kalahari Game Reserve.
Supplementary Information: They have been relocated to New Xade outside the game reserve (Monaka & Chebanne, 2005: 102; Barham & Mitchell, 2008: 445).

4. **ǂHaba**
Names: The ǂHaba are northern or central Khoe people.
Location: South of Maun
Supplementary information: They have linguistic affinities with the Naro, G|wi, and the ||Anikhoe (Barnard, 1992: 152).

5. **Ju|'hoansi or Sekaukau communities**
Names: The Ju|'hoansi, meaning "real people", Ju|wasi, or Zu'|hoāsi. They are a central !Kung-speaking group (Biesele & Royal, 2010: 205). The language of the Ju|'hoansi is known as Ju|'hoan or Sekaukau (Chebanne, 2008: 102).
Location: They are found in the Northwest region of Botswana (Ngamiland district) and in Namibia.
Supplementary information: They have been much studied by Lee (1979, 2003) and Marshall (1976, 1999, 2001).

6. **Naro**
Names: They are the Western Khoe (Chebanne, 2008: 95); members of the group living farther east are known as the Nharo, Naron (-n plural suffix), and ||aikwe (Bleek, 1928: 2).
Location: The Naro are a Central Kalahari Group and are found in the west of Ghanzi.
Supplementary information: They are multi-income groups who work on Ghanzi cattle ranches and herd

goats in addition to maintaining a traditional means of subsistence. (Barnard, 1992: 138; Chebanne, 2008: 105). Like other Khoe peoples, they have historical connections with pastoralism.

7. **Nyebequh**
Names: Mojathutwa in Setswana
Location: Okavangu

8. **Tshao**
Names: Sometimes called Shua (Güldemann & Vossen, 2005: 100).
Location: Traditionally Northeast Botswana, south of the Okavango.
Supplementary information: They are very similar to the Naro and ǂHaba (Barnard, 1992: 152).

9. **!Xõ**
Names: They are non-Khoe (San) and call themselves by many names (Barnard, 1992: 16). The eastern groups are often called the ǂHoǎ, and the southern groups the Tshasi (Barnard, 1992: 62).
Location: South of Ghanzi, located at boreholes to the west and east of the trans-Kalahari road.
Supplementary information: They were part of H. J. Heinz's resettlement plan at Bere (Barnard, 1992: 73). Their persistence hunting has been documented by Liebenberg (2006) and featured in the David Attenborough film series "The Life of Mammals (2002)."

Appendix 3. Information gathered during informal conversations preceding the interviews

1. Hunting party size
Hunting parties were small, usually only consisting of two people. However, once the prey had been killed, other members of the group were contacted to transport the meat to the camp. The usual maximum size for a hunting party was four or five, although 10 men were used for elephant hunting (Ju|'hoansi). Two interviewees (Ju|'hoansi and !Xõ) said that they often went hunting alone.

2. Women and hunting
Although wives of Naro hunters traditionally do not participate in hunting episodes (Barnard, 1992: 142), in some instances, it seems that women do join their husbands on the hunt. For example, the Sekaukau (Ju|'hoansi) interviewees recounted that they used to go hunting with their wives and infants. Infants were given the breast when prey was spotted in order to keep them quiet. Biesele & Royal (2010: 206) mentioned that Ju|'hoansi women often assisted with tracking, although she did not specify whether they accompanied the men until the end of the hunt. Some of the wives of the interviewees were fully versed in iconic gesturing, suggesting that although they may not have been active hunters, they may have accompanied their partners during hunting sessions or had been exposed to the gestures outside the hunting arena, for example, during story-telling sessions.

3. Prey and predator species
Table 2 provides a full list of the game species and predators mentioned during the interviews. The gemsbok was the most popular prey species. This has also been documented by Barnard (1992: 90) for the 'Southern Bushmen.' One interviewee (Ju|'hoansi) from Xai Xai stated that he ate a lot of elephant meat in his youth, which his father would hunt in groups of 10 men with spears.

4. Hunting methods
Bows and poisoned arrows accompanied by spears were the most common weapons used. Running after game in order to tire it was quoted as a hunting method by 11 of the 23 interviewees from the G|wi, Ju|'hoansi, Sekaukau (Ju|'hoansi), Naro, Tshao, and !Xõ ethnic communities. This indicates that the persistence hunt may have been more widely practiced than was previously thought. In all cases, hunting took place throughout the year, although certain prey species were taken at certain times of the year. For example, the wildebeest was considered too fast to hunt during the dry season and was therefore only pursued during the wet season, when muddy terrain would slow it down.

5. Relationships with competing predators
Opportunistic kleptoparasitism was practiced in all groups. Lions were frightened away from their prey by men who advanced towards the carcass, rushing the animals, shouting, and waving arms, sticks, or hats. The most dangerous predator was the leopard; two interviewees had suffered serious injury to the head during leopard attacks.

Appendix 4. Nominal iconic-gesture taxonomy/lexicon of animals
The ethnic community indicated in bold type is the group whose gestures are shown by the example in the photograph.
In some cases, more than one iconic gesture was demonstrated by the same interviewee or the same ethno-linguistic community, in which case, all variations are shown. For example, the two versions of the Ju|'hoansi gesture for the common duiker are shown in Figures 22 and 23.

Order Artiodactyla, ruminants

Cephalophini
Common Duiker (*Sylvicapra grimmia*)


Fig. 17. Naro, Nyebequh


Fig. 18. ǂHaba


Fig. 19. Danisi


Fig. 20. Tshao, ||Ani


Fig. 21. G/wi


Fig. 22. Ju|'hoasni


Fig. 23. Ju|'hoansi


Fig. 24. !Xõ

Neotragini
Steenbok (***Raphicerus campestris***)

Fig. 25. ||**Ani**, ǂHaba, Tshao

Fig. 26. Naro, Nyebequh, Danisi

Fig. 27. G/wi, Ju|'hoansi

Fig. 28. !Xõ

Fig. 29. !Xõ

Springbok (***Antidorcas marsupialis***)

Fig. 30. ||**Ani**, ǂHaba

Fig. 31. Naro, Tshao

Fig. 32. Danisi, Nyebequh

Fig. 33. Ju|'hoasni, G/wi, !Xõ

Fig. 34. Ju|'hoasni

Fig. 35. !Xõ

Hippotragini
Gemsbok (*Oryx gazella*)

Fig. 36. Tshao, Ju|'hoansi, Naro, ǂHaba

Fig. 37. G/wi, Danisi, Sekaukau, ||Ani

Fig. 38. Nyebequh, Ju|'hoasni

Alcelaphini
Red Hartebeest (*Alcelaphus busselaphus*)

Fig. 39. ||Ani

Fig. 40. Nyebequh, Ju|'hoasni

Fig. 41. Tshao, Naro

Fig. 42. G/wi, Danisi, Naro, Ju|'hoasni

Fig. 43. Ju|'hoasni

Fig. 44. !Xõ

Blue Wildebeest (*Connochaetes taurinus*)

Fig. 45. ||Ani, Ju|'hoansi, Naro, Nyebequh, ǂHaba

Fig. 46. Naro, Ju|'hoasni Danisi, Tshao

Fig. 47. Ju|'hoasni, G/wi

Fig. 48. Naro

Fig. 49. !Xõ

Aepycerotini
Impala (*Aepyceros melampus*)

Fig. 50. Danisi

Fig. 51. Tshao

Tragelaphini
Greater Kudu (*Tragelaphus strepsiceros*)

Fig. 52. Nyebequh, Ju|'hoansi , ||Ani, Tshao

Fig. 53. Naro, G/wi, ǂHaba

Fig. 54. Ju|'hoasni

Fig. 55. !Xõ

Eland (*Tragelaphus oryx*)

Fig. 56. Ju|'hoansi, Naro, ǂHaba, Danisi, Tshao

Fig. 57. ||Ani

Fig. 58. Nyebaquh

Fig. 59. G/wi, Ju|'hoasni

Fig. 60. Ju|'hoasni

Bovini
Buffalo (*Syncerus caffer*)

Fig. 61. Danisi, Ju|'hoansi, Tshao

Giraffe (*Giraffe camelopardalis*)

Fig. 62. Ju|'hoansi, ||Ani, Tshao

Fig. 63. ||Ani

Fig. 64. Naro

Fig. 65. Nyebequh

Fig. 66. Danisi

Fig. 67. G/wi, Sekaukau

Order Artiodactyla, non-ruminants
Suidae
Common Warthog (*Phacochoerus aethiopicus*)

Fig. 68. ||Ani

Fig. 69. Naro

Fig. 70. Ju|'hoasni, Naro, Nyebequh, Tshao

Fig. 71. G/wi, Danisi, ǂHaba

Perissodactyla
Equidae
Plains Zebra (*Equus quagga*)

Fig. 72. Ju|'hoansi

Fig. 73. Ju|'hoansi, Tshao

Fig. 74. ||Ani, Nyebequh

Order: Proboscidea
Elephant (*Loxodonta africana*)

Fig. 75. Ju|'hoansi

Fig. 76. Danisi

Fig. 77. Ju|'hoasni

Carnivores
Spotted Hyena (*Crocuta crocuta*)

Fig. 78. Ju|'hoansi, Tshao

Fig. 79. Naro

Fig. 80. Nyebequh

Fig. 81. G/wi

Family Felidae
Caracal Lynx (*Felis caracal*)

Fig. 82. **||Ani**, Nyebequh

Leopard (*Panthera pardus*)

Fig. 83. Ju|'hoansi, G/wi

Fig. 84. Nyebequh

Lion (*Panthera leo*)

Fig. 85. Ju|'hoans

Fig. 86. Ju|'hoansi

Fig. 87. Nyebequh, Naro, ||Ani

Fig. 88. ǂHaba

Fig. 89. Danisi, Tshao, G/wi, Ju|'hoasni

Fig. 90. Ju|'hoasni

Family Canidae
Bat-eared Fox (*Otocyon megalotis*) and Black-backed jackal (*Canis mesomelas*)

Fig. 91. ǂHaba, Naro

Fig. 92. ||Ani

Fig. 93. Tshao, G/wi

Fig. 94. Ju|'hoansi, Naro

Fig. 95. Ju|'hoansi

African Wild Dog (*Lycaon pictus*)

Fig. 96. Nyebequh, ||Ani , Naro

Fig. 97. Ju|'hoansi

Fig. 98. ǂHaba, Tshao

Ostrich (*Struthio camelus*)

Fig. 99. ||Ani, Naro, Nyebequh

Fig. 100. ǂHaba

Fig. 101. Danisi, Ju|'hoansi

Fig. 102. Tshao, Naro

Fig. 103. G/wi

Fig. 104. !Xõ

Crested Guinea-fowl (*Guttera edouardi*)

Fig. 105. Ju|'hoansi, ||Ani, Naro, ǂHaba, Danisi, G/wi

Fig. 106. Tshao

Fig. 107. Ju|'hoasni

Appendix 5. !Xõ signs based on the shape of spoors

Fig. 108. Eland (*Tragelaphus oryx*)

Fig. 109. Gemsbok (*Oryx gazella*)

Fig. 110. Red hartebeest (*Alcelaphus busselaphus*)

Fig. 111. Blue wildebeest (*Connochaetes taurinus*)

Fig. 112. Greater Kudu (*Tragelaphus strepsiceros*)

Fig. 113. Springbok (*Antidorcas marsupialis*)

Fig. 114. Warthog (*Phacochoerus aethiopicus*)

Fig. 115. Bat-eared Fox (*Otocyon megalotis*)

Fig. 116. Crested Guinea-fowl (*Guttera edouardi*)